



ENSC 440

Final Presentation

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Presentation Outline Guide

Company 7

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Executive Summary

As populations and accessibility to driving have increased, finding parking has become difficult in busy areas such as universities, malls, and stadiums. A smart parking system allows drivers to save valuable time and prevent unnecessary frustration while seeking a vacant stall. Indicators act as a tool to help guide traffic and inform drivers well before they start their search. With congestion removed and reliance on luck out of the equation, time wasted, and vehicle emissions are decreased for a more pleasant parking and visiting experience

OpenSpot is developing a smart parking system consisting of computer vision, light indicators, and a website with real-time spot specific statuses. The system is packaged in a discrete hardware module to be mounted on existing light poles which ensures complete coverage and easy installation for a low entry to barrier solution. The LED light indicator informs drivers about the current density of parked cars around the light poles. This gives drivers an understanding of how easy or difficult it may be to find a vacant spot and guide them to take calculated risks in terms of time spent seeking a parking stall

Security within parking lots is a concern among drivers due to incidents involving vehicle break ins, vandalism, and hit-and-runs. As a solution to this ongoing issue, the module houses a microphone to capture audio recordings which are analyzed to detect the presence of active car alarms. Upon detection, an alert is sent to parking lot owners and security personnel to help them promptly respond to an incident. This will give drivers peace of mind knowing that their vehicle will be monitored throughout the duration of their stay.

Along with the light indicators and website, OpenSpot's smart parking system will allow users to subscribe to text notifications to receive alerts about the status of the parking lots in which they are interested. The added information before arriving at the parking lot will greatly reduce frustrations and allow drives to adjust their search strategy accordingly.

The global market for smart parking systems was \$4.4 billion in 2020 with an expected compound annual growth rate of 21% over the next 7 years. The current market size for the parking lot industry is around \$9.4 billion which indicates that there will not be a lack of opportunity to install our smart parking system. OpenSpot's modules are a cost-effective way to integrate a smart parking solution that can cover multiple parking stalls and the entire system can be installed on existing parking infrastructure. The entry to barrier is low as it saves money from less hardware to maintain and decreased installation costs which will attract and incite potential clients.

Our team is excited to offer OpenSpot as a smart parking system that is cost effective, enhances the presence of security, and saves users valuable time by keeping them actively informed. As a team of five determined and hard-working engineering students with experience in areas such as hardware, software development, and system design, we are excited to offer a system to advance the world of smart parking solutions.



Presentation Outline

1. Team Introduction
 - a. CEO - Justin Naorbe
 - b. CHO - Gurmeh Shergill
 - c. CTO - Soroush Lighvan
 - d. CCO - Curtis Lui
 - e. CIO - Darius Nadem
2. Problem and Solution
3. Technical Case
 - a. System Design - High Level Overview
 - b. Current State of Hardware
 - c. Hardware Materials and Sustainability
 - d. Current State of PCB
 - e. Current State of Computer Vision (CV)
 - f. Current State of Audio Recognition
 - g. Current State of Website
 - h. Current State of Text Notifications
 - i. Utility Scripts Developed
 - j. Installation Software
 - k. Development Schedule (Actual vs Planned)
4. Business Case
 - a. Market Size
 - b. Budget
 - c. Competition
 - d. Price and Business Model
 - e. Financing
 - f. Ideal Customers
5. Risk Analysis and Risk Management
 - a. Risk and Safety
 - b. Business Risks
6. Adherence to Standards
 - a. Hardware Standards
 - b. GUI Standards
7. Project Demonstration
 - a. User Manual - Planning Phase
 - b. User Manual - Previewing Module
 - c. User Manual - Installation Software
 - d. Text Notifications
8. Summary, Reflection and Conclusion
 - a. Feedback Incorporated
 - b. Summary of Project
 - c. Team Learnings and Reflection



- d. Individual Learnings
- e. Future Plans for OpenSpot
- f. Acknowledgements